

Emergency Departments and Crowding in United States Teaching Hospitals

Study objectives: To assess the extent and distribution of hospital and emergency department crowding nationally.

Design: The research design consisted of a mailed questionnaire disseminated in the fall of 1988 to the member institutions of the National Association of Public Hospitals (NAPH) and the Council of Teaching Hospitals (COTH).

Type of participants: Study participants included hospital administrators and ED directors from 239 of the non-Veterans Administration, general acute care, US members of COTH and NAPH.

Measurements: Key measures of hospital and ED crowding including mean ED holding times for floor and ICU beds.

Main results: Three fourths of responding hospitals reported increases in ED visits over the preceding three years. Mean ED holding times for admitted patients were 3.5 hours (median, 2.0 hours) for a floor bed and 2.9 hours (median, 1.5 hours) for an ICU bed. Half of all hospitals noted maximum waits for floor and ICU beds of ten hours or more and seven hours or more, respectively. Measures taken by hospitals to manage crowding during August 1988 included restricting access to some types of patients (mean, 3.6 days), actively transferring patients to other hospitals (mean, 2.2 days), transfer refusal (mean, 2.8 days), and total ambulance diversion (mean, 1.6 days).

Conclusions: Our study strongly suggests that ED crowding is not an isolated phenomenon; ED crowding and its attendant problems appear to affect hospitals with similar adverse effects regardless of ownership. Although our results suggest that ED crowding is concentrated in metropolitan areas and in a smaller subset of hospitals, we found instances of crowding among hospitals nationwide. [Andrulis DP, Kellermann A, Hintz EA, Hackman BB, Weslowski VB: Emergency departments and crowding in United States teaching hospitals. Ann Emerg Med September 1991; 20:980-986.]

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INTRODUCTION

Hospital crowding in US cities and the impact on patients admitted through the emergency department have received increasing attention in recent years. Stories such as "Emergency Room Gridlock: On the Verge of Crisis"¹ have become almost commonplace in newspapers and magazines, whereas other stories from New York,² Boston,³ Philadelphia,⁴ Los Angeles,⁵ Dallas,⁶ and Kansas City⁷ highlight city or multicity⁸ problems. A recent article noted that "Emergency rooms are themselves emergencies — disasters to which disaster victims are taken."⁹ A few studies have cited the problems of specific hospitals or cities.^{10,11} Reports issued from state task forces¹² or city or state health departments^{13,14} have documented area crises. However, no study has examined the problem nationally or compared the difficulties facing hospitals providing emergency care in cities across the United States.

The research reported here is based on a study of ED use and crowding among the major providers of such care — US teaching hospitals. The objectives of our investigation were specifically intended to address the issues of the extent of crowding in metropolitan areas, the frequency and length of delays in admission related to crowding, and the consequences to

and action taken by hospitals faced with crowding.

MATERIALS AND METHODS

In the fall of 1988, we disseminated a survey to the 498 hospitals that constitute the combined membership of the National Association of Public Hospitals (NAPH) and the Association of American Medical Colleges' Council of Teaching Hospitals (COTH). The members of these two organizations collectively represent the majority of the nation's major teaching institutions that are located predominantly in metropolitan areas. Together, they train about three fourths of all medical residents in the United States.

Surveys were mailed to all member chief executive officers of the two organizations with an accompanying cover letter suggesting that the questionnaire be sent to hospital ED directors for completion. The survey requested respondents to provide information from October 1, 1987, through September 30, 1988, on general hospital characteristics and hospitals' service communities, ED characteristics, and ED operations. A specific set of questions on hospital crowding, related ED problems, and responses to those problems requested information for the one-month period beginning August 1, 1988.

A second mailing was sent to non-respondent hospitals in January 1989, and telephone follow-up was conducted during June and July 1989 to clarify reported information and, whenever possible, obtain missing data. Seventy-four Veterans Administration hospitals, 16 specialty institutions, and three non-US hospitals (one hospital was both Veterans Administration and non-US) were excluded from the analysis, thereby reducing the total number of hospitals to 406.

To investigate whether differences in ED crowding and hospitals' responses to crowding occurred by hospital ownership, we examined the data for the overall response group as well as for public and private facilities. Statistical analysis to compare differences in group means between the two ownership categories consisted of two-tailed *t* tests. Because of the skewed nature of the data for several variables, we have reported median, range, and quartile information

TABLE 1. General hospital and ED characteristics by ownership — 1988

	Mean	Minimum	25th Percentile	Median	75th Percentile	Maximum
No. of Staffed Beds						
Overall	505	107	350	469	615	1,291
Public	487	115	332	453	583	1,217
Private	515	107	354	482	629	1,291
No. of ICU Beds						
Overall	62	0	32	55	86	229
Public	56	0	30	55	76	169
Private	64	0	33	55	91	229
Hospital Occupancy Rates (%)						
Overall	78.7	43.0	73.0	79.0	85.0	102.0
Public	79.3	62.0	74.0	80.0	86.0	102.0
Private	78.4	43.0	72.5	79.0	85.0	95.0
ICU Occupancy Rates (%)						
Overall	81.1	39.0	73.0	82.0	90.0	106.0
Public	80.8	39.0	73.0	82.0	90.0	106.0
Private	81.3	51.0	73.0	82.0	90.0	102.0
Length of Stay (Days)						
Overall	7.4	2.0	6.4	7.3	8.3	16.0
Public	7.3	2.0	6.0	6.8	8.4	16.0
Private	7.5	5.0	6.6	7.3	8.3	13.0
Annual ED Visits*						
Overall	46,873	7,397	30,500	40,928	55,276	236,979
Public	60,084	15,305	33,899	48,269	78,214	236,979
Private	40,352	7,397	29,161	38,671	48,445	117,801
ED Visits Arriving by Ambulance (%)*						
Overall	17.6	.1	12.0	15.0	20.0	81.0
Public	15.1	.1	10.0	14.0	19.0	43.0
Private	18.8	1.0	13.8	17.0	20.0	81.0
ED Patients Admitted for Inpatient Care (%)*						
Overall	18.3	1.9	15.0	17.5	21.0	55.0
Public	16.7	6.5	13.0	16.0	18.2	55.0
Private	19.1	1.9	15.0	18.0	22.0	40.0
Hospital Inpatient Admissions Through the ED (%)*						
Overall	38.5	4.0	27.0	35.0	47.5	91.0
Public	44.8	10.0	30.8	40.0	61.2	90.1
Private	35.4	4.0	25.0	35.0	42.0	91.0

Change in Volume of Annual ED Visits From January 1, 1985, Through January 1, 1988

Hospitals Reporting Increased Visits (%)

Overall	78.3
Public	75.3
Private	79.7

Increased Visits (%)

Overall	14.2	0.5	5.9	10.7	17.0	157.0
Public	13.2	2.0	7.0	11.5	16.0	45.0
Private	14.7	0.5	5.4	10.0	17.9	157.0

*Comparisons of public and private hospital mean values by *t* tests resulted in significant differences ($P < .01$). Data reported by 239 hospitals: 79 public and 160 private.

(Tables and, where appropriate, in the text of this article). In addition, because of the presence of particularly

high outliers for measures of crowding and hospitals' responses to ED overload, we have reported 90th per-

TABLE 2. Hospital and ED crowding characteristics — 1988

	Mean	Minimum	25th Percentile	Median	75th Percentile	90th Percentile	Maximum
Mean Wait for a Floor Bed (hr)							
Overall	3.5	0.0	1.0	2.0	4.0	7.4	40.0
Public	4.3	0.0	1.0	2.0	4.0	12.0	40.0
Private	3.1	0.0	1.0	2.0	4.0	6.0	40.0
Maximum Wait for a Floor Bed (hr)							
Overall	21.3	0.0	4.0	10.0	30.0	48.0	288.0
Public	25.3	1.0	4.0	10.0	36.0	63.1	240.0
Private	19.3	0.0	4.0	10.0	24.0	48.0	288.0
Mean Wait for an ICU Bed (hr)							
Overall	2.9	0.0	0.5	1.5	4.0	6.0	48.0
Public	2.7	0.0	0.5	1.5	3.8	6.0	18.0
Private	3.0	0.0	0.5	1.5	4.0	6.1	48.0
Maximum Wait for an ICU Bed (hr)							
Overall	15.1	0.5	3.0	7.0	24.0	39.9	120.0
Public	15.7	0.5	3.3	8.0	18.0	49.2	72.0
Private	14.7	0.5	3.0	6.0	24.0	36.0	120.0
Mean Days of Crowding in August 1988*							
Overall	11.6	0.0	2.0	9.0	20.0	31.0	31.0
Public	14.0	0.0	4.0	12.0	25.3	31.0	31.0
Private	10.3	0.0	1.0	7.0	15.0	30.0	31.0

*Comparisons of public and private hospital mean values by *t* tests resulted in significant differences ($P < .05$).
Data reported by 208 hospitals, 69 public and 139 private.

centile data for these variables.

To assess the representativeness of the response group, comparisons of respondent and nonrespondent groups of hospitals were made on the basis of ownership, bed size, distribution by size of primary metropolitan statistical area (PMSA), and annual ED visits. Ownership, bed size, and PMSA analysis revealed no significant differences. Annual ED visits for nonresponding facilities were obtained from COTH based on numbers reported in the American Hospital Association (AHA) 1988 annual survey of hospitals.

Statistical analysis of the two groups with respect to ED visits revealed that respondent hospitals had a significantly higher mean number of annual ED visits (46,873, $P < .05$) than nonrespondents (40,615). Therefore, our response group slightly over-represented heavy providers of emergency care. Individual item response rates for variables varied but fell within a fairly narrow range (51% to 59%).

RESULTS

General Hospital Characteristics

Two hundred thirty-nine hospitals

from 40 states responded to the survey, representing 59% of the non-Veterans Administration, general acute care, US members of COTH and NAPH. Responding institutions included 160 private hospitals, virtually all of which were nonprofit, and 79 public facilities. These hospitals comprise just 4% of general acute care hospitals in the United States but provided 14% of all ED visits during 1988.¹⁵

Hospitals responding to the survey had a mean of 500 staffed and 60 ICU beds (Table 1). Overall hospital and ICU occupancy rates were 79% and 81%, respectively, with ranges for both rates exceeding 100% at the upper limit. To meet the need for inpatient beds during periods of excess demand, hospitals may be forced to set up temporary beds or use unlicensed beds, thereby achieving occupancy rates of more than 100%. The mean length of a patient's stay in these hospitals was 7.4 days (range, two to 16 days) during 1988. Statistical comparisons by ownership revealed, in general, no significant differences between public and private hospitals. When ownership was subdivided by PMSAs with at least 1

million population compared with those with less than 1 million inhabitants, no significant differences were found for these variables.

ED Characteristics

Mean annual ED visits were 46,873 (median, 40,928; range, 7,397 to 236,979) during the year of study; mean ED visits to public hospitals (60,084) were significantly greater than to private facilities (40,352, $P < .01$) (Table 1). In private hospitals, the mean percentage of ED patients who arrived by ambulance (18.8%) and the mean percentage of ED patients admitted for inpatient care (19.1%) were significantly higher than in public hospitals ($P < .01$ for both). However, public hospitals reported a significantly higher percentage of hospital inpatient admissions occurring through the ED (44.8% public vs 35.4% private, $P < .01$).

Three fourths of responding hospitals (78.3%) reported an increase in ED visits between 1985 and 1988. The mean increase (14.2%) did not differ significantly by ownership. Comparing ownership by PMSAs, public hospitals in areas of 1 million or more reported a significantly higher number of annual ED visits (70,121) and a significantly greater percentage of total hospital admissions occurring through the ED (52%) than public hospitals in less populated PMSAs (44,932 visits, 33% admissions) ($P < .01$ for both variables).

Hospital and ED Crowding

In general, ED crowding occurs when ED patients are ready but unable to be admitted to either a floor or an ICU bed and are held in the ED. ED directors, charged with the responsibility for completing the survey, were given a working definition of holding time as "the delay from the time an emergency patient is completely evaluated and the orders are written for admission to a ward or floor bed until the patient actually leaves your emergency department." ED directors determined the specific method for measuring holding times in their hospitals' EDs using this definition.

Hospitals reported mean holding times for floor patients of 3.5 hours (median, 2.0 hours) (Table 2). We also asked ED directors to report the maximum length of time during the

study period that one or more admitted patients were held in the ED before a vacant floor bed became available. Responding institutions reported that admitted ED patients experienced a mean maximum wait of 21.3 hours (median, 10.0 hours) for a vacant floor bed. Differences in means were not significant by ownership.

Hospitals' reported mean holding times for critically ill or injured patients in their EDs (mean, 2.9 hours; median, 1.5 hours) were less than those noted for floor patients. Mean maximum ED wait for critical care patients was 15.1 hours (median, 7.0). In 10% of facilities, the maximum wait for critical care patients approached or exceeded 40 hours. Public and private hospitals demonstrated no significant differences.

To estimate how often crowding occurs in these EDs, we asked ED directors to report the number of days during the month of August 1988 that they were required to hold admitted ED patients in their departments for four or more hours because of a lack of vacant or staffed inpatient beds. Overall, responding hospitals met this criterion a mean of 11.6 days (median, 9.0) during the month. Public hospital EDs were crowded a mean of 14.0 days in August 1988 compared with 10.3 days at private hospitals ($P < .05$). Ten percent of hospitals experienced crowding virtually every day during August 1988, regardless of ownership status.

Crowding comparisons of public hospitals located in large and smaller PMSAs (ie, mean holding times for both floor and ICU beds and days of crowding) were significant ($P < .05$). In all cases, the large PMSA public institutions reported greater numbers of days or mean times during the study period for these variables.

Measures to Manage Crowding

Hospitals also were asked to identify from a list what options, if any, they had exercised at least one day (for either all or part of a 24-hour period) during August 1988 in response to crowding at their facility. Responding facilities restricted access to some ambulance patients and refused patient transfers from other hospitals a mean of 3.6 and 2.8 days, respectively. Each of these options was used 11 days or more by 10% of hospitals. Actively transferring pa-

	Mean	Minimum	25th Percentile	Median	75th Percentile	90th Percentile	Maximum
Options Used to Manage Crowding (Days in August 1988)							
Refuse Transfers*							
Overall	2.8	0.0	0.0	0.0	1.0	11.6	31.0
Public	5.2	0.0	0.0	0.0	6.8	20.5	31.0
Private	1.7	0.0	0.0	0.0	0.0	5.0	31.0
Transfer to Other Hospitals							
Overall	2.2	0.0	0.0	0.0	2.0	5.0	31.0
Public	3.0	0.0	0.0	0.0	2.8	10.2	31.0
Private	1.9	0.0	0.0	0.0	1.1	5.0	31.0
Restrict Access to Some Ambulance Patients							
Overall	3.6	0.0	0.0	0.0	4.0	12.0	31.0
Public	4.8	0.0	0.0	0.0	7.0	19.6	31.0
Private	3.0	0.0	0.0	0.0	3.4	10.0	28.0
Restrict ED Access to All Ambulance Patients							
Overall	1.6	0.0	0.0	0.0	0.0	5.0	31.0
Public	1.4	0.0	0.0	0.0	0.8	4.7	18.0
Private	1.7	0.0	0.0	0.0	0.0	5.5	31.0
Other Options Used to Relieve Crowding†							
Overall	5.8	0.0	0.0	2.0	10.0	14.6	31.0
Public	8.1	0.0	0.0	6.0	10.0	31.0	31.0
Private	4.6	0.0	0.0	2.0	9.5	14.1	31.0

*Comparisons of public and private hospital mean values by *t* tests resulted in significant differences ($P < .01$).

†Data reported by 43 hospitals: 15 public and 28 private.

Total data reported by 219 hospitals: 72 public and 147 private.

tients to another hospital was used a mean of 2.2 days. Hospitals implemented diversion or "drive-by" status a mean of 1.6 days during the study month (Table 3). Twenty percent of the hospitals specified that they had adopted other options, which included "opening recovery rooms and other vacant spaces" (13 hospitals) and "expediting discharges" (seven facilities). Among listed alternatives, only transfer refusal was significant by ownership ($P < .01$). Public hospitals used this option a mean of 5.2 days compared with 1.7 days for private facilities.

Characteristics of EDs in Selected Cities

To examine emergency care at the local level, we identified seven PMSAs where hospital survey responses represented a proportion of emergency visits of 20% or more for their area during the study year. Cities with six to 29 study hospitals, representing between 20% and 52% of all emergency visits and 13% to 43% of the beds in each PMSA, met

this criterion (Table 4). The information presented for the selected group of PMSAs is intended to illustrate problems faced by hospitals in these areas, and comparisons of differences in variables among metropolitan areas are limited to inspection of the data.

Among responding hospitals, facilities in New York reported the highest mean hospital and ICU occupancy rates (90.8% and 91.1%, respectively), which were well above the average values for institutions in any other area (next highest overall and ICU occupancy rates, respectively: Philadelphia [82.2%] and Washington, DC [85.1%]). Los Angeles hospitals reported the highest mean number of ED visits (67,654), followed by New York (63,038); however, Detroit and Washington hospitals had the highest median number of visits (55,125 and 54,962, respectively), reflecting the extremely high volume handled by a few facilities in New York and Los Angeles. Hospitals in three PMSAs (Detroit, New York, and Washington) reported that

TABLE 4. General characteristics of EDs in selected PMSAs — 1988

	Chicago	Detroit	Los Angeles	New York	Philadelphia	St Louis	Washington
No. of Hospitals Responding	11	6	9	29	12	6	8
PMSA Population*	6,216,300	4,352,400	8,587,800	8,567,000	4,920,400	2,466,700	3,734,200
No. of Annual ED Visits							
PMSA total†	2,024,679	1,529,048	2,480,062	3,378,444	1,641,169	924,731	1,179,085
Survey total	509,063	300,744	608,889	1,765,075	412,574	207,256	426,261
Survey total as a percent of PMSA total	25	20	25	52	25	22	36
No. of Annual ED Visits per Hospital							
Mean	46,279	50,124	67,654	63,038	34,381	34,543	53,283
Median	37,552	55,125	43,917	48,697	34,526	29,476	54,962
Range	27,300 – 120,000	30,000 – 61,634	13,356 – 225,032	7,397 – 145,000	19,539 – 56,250	15,517 – 62,515	26,052 – 85,032
No. of Staffed Beds							
PMSA total†	25,761	15,656	29,772	38,838	20,352	12,887	10,824
Survey total	6,695	2,425	3,802	16,677	4,772	3,332	4,050
Survey total as a percent of PMSA total (%)	26	15	13	43	23	26	37
Length of Stay (Days)							
PMSA mean†	7.5	7.5	6.6	9.8	7.7	7.8	6.9
Survey mean	7.4	7.3	6.0	9.6	7.9	7.7	8.1
Survey median	7.5	7.2	6.0	9.8	7.8	8.3	8.0
Survey range	6.4 – 9.6	5.6 – 9.3	4.5 – 7.6	1.5 – 15.5	6.2 – 9.8	6.2 – 8.9	7.0 – 10.3
ED Admissions as a Percent of Total Hospital Admissions (%)							
Mean	36.1	53.0	37.4	52.1	33.8	32.4	50.2
Median	35.0	47.0	40.0	51.8	35.0	35.0	55.0
Range	13 – 70	33 – 91	10 – 65	11 – 90.1	8 – 72	20 – 42	20 – 82
Hospital Occupancy Rate (%)							
Mean	71.3	75.7	80.2	90.8	82.2	73.8	78.7
Median	73.0	79.5	81.0	90.5	83.0	76.0	76.0
Range	51 – 84	64 – 81	59 – 102	85 – 97	72 – 92	66 – 76	70 – 94
ICU Occupancy Rate (%)							
Mean	79.0	80.3	82.7	91.1	84.5	77.8	85.1
Median	76.0	83.0	78.0	93.5	83.5	77.5	88.0
Range	70 – 92	61 – 90	70 – 100	69 – 100	73 – 95	66 – 90	60 – 96

*Source: Bureau of the Census: United States Department of Commerce News. September 8, 1989.

†Source: AHA: Hospital Statistics: 1989-90 Edition.

inpatients admitted through the ED exceeded 50% of all admissions.

Mean holding times in the ED for floor and ICU patients varied greatly. New York City institutions reported mean waits for floor (10.3 hours) and ICU beds (8.0 hours) that were 130% and 48%, respectively, greater than values for the next highest group of metropolitan hospitals (Detroit). Similarly, median ED holding times for floor and ICU patients were highest in New York. Hospitals in Los Angeles and Washington reported mean waits for floor beds of more than three hours (Table 5).

With the exception of St Louis, each of the study areas experienced mean days of crowding in August 1988 of eight or more (median, five

days). Half of the responding hospitals in New York, Los Angeles, and Detroit experienced crowding a minimum of 18 days during the reference month. At least one hospital in six of the seven PMSAs was crowded virtually every day.

Hospitals varied in their responses to crowding. Restricting ED access to certain ambulance patients such as those with trauma or cardiac arrest was the most common response in New York, Detroit, and Los Angeles; 50% of hospitals in each of these areas restricted access to some patients a minimum of eight days. Transfer refusal occurred most frequently in Los Angeles (mean, 8.1; median, 7.0) and Detroit (mean, 6.6; median, 3.0). New York hospitals

were most likely to divert all ambulance patients, although one or more hospitals in five of the seven PMSAs exercised this option at least once during August 1988. Half of responding New York facilities restricted access to all ambulance patients a minimum of two days during the study month.

DISCUSSION

This investigation profiles the national ED situation among a group of hospitals that represent major providers of such care in the United States. Although definitions of "crowding" and descriptions of "holding time" were included in the survey, no standard method has been established for the monitoring or

tracking of these situations by hospitals. Many of the responses dealing with operational issues in the ED are unavoidably subjective. Some responses, such as mean holding times, were probably based on estimates provided by each responding hospital's ED director. At present, few EDs have a computerized tracking system or even a manual log for documenting holding times.¹⁶ In the absence of more detailed statistics, it is currently impossible to more accurately determine ED holding times or the frequency with which extreme waits occur at a large number of institutions. Also, the focus on teaching hospitals located primarily in major metropolitan areas may not reflect conditions in the nation's other community institutions.

Keeping in mind these limitations, we believe the study provides some insight into the national and municipal problems of emergency care, while suggesting other areas for investigation. Our study supports earlier local and state reports and confirms that crowding affects metropolitan areas across the United States. It also corroborates related assessments by the American College of Emergency Physicians¹⁷ and the Emergency Nurses Association.¹⁸ Our results support the contention that public institutions, especially those in areas with greater populations, may be encountering particularly severe occurrences, as manifest in a greater proportion of total hospital admissions occurring through the ED and a higher number of crowding days. Although a higher percentage of transfer refusals among public institutions may be indicative of a more severe situation or of differences in the nature of the potential transfers, further investigation of this finding is necessary.

Transcending ownership, both public and private institutions reported high occupancy rates for floor and ICU. A substantial number of both public and private hospitals identified maximum waiting times for floor or ICU beds of more than 24 hours and reactions to crowding that required restricting ambulance patients, diverting ambulances for all cases, or transferring those needing care.

No temporal or institutional benchmarks exist by which to compare teaching hospital crowding and

TABLE 5. Characteristics of ED crowding in selected PMSAs — 1988							
	Chicago	Detroit	Los Angeles	New York	Philadelphia	St Louis	Washington, DC
No. of Hospitals Responding	11	6	9	29	12	6	8
Wait for a Floor Bed (hr)							
Mean	1.6	4.4	3.5	10.3	1.9	0.8	3.2
Median	1.1	4.0	3.5	7.8	2.0	0.3	2.5
Range	0 – 6	2 – 7.2	0.5 – 8.5	2 – 40	0.1 – 4	0.3 – 2.5	1 – 6.5
Wait for an ICU Bed (hr)							
Mean	1.2	5.4	4.1	8.0	2.5	0.6	1.0
Median	0.5	5.0	3.0	6.0	1.0	0.2	1.0
Range	0.3 – 4	0 – 12	0.5 – 16	0 – 48	0.3 – 10	0.2 – 1.5	0.3 – 2
Days of Crowding in August 1988							
Mean	8.8	15.2	14.1	22.8	13.8	1.8	13.0
Median	5.0	19.0	18.0	29.5	12.0	1.0	6.5
Range	0 – 29	0 – 30	0 – 31	0 – 31	0 – 31	0 – 5	0 – 31
Options to Manage Crowding (Days in August 1988)							
Refuse Transfers							
Mean	0.1	6.6	8.1	6.4	0.0	0.2	2.3
Median	0.0	3.0	7.0	0.0	0.0	0.0	0.0
Range	0 – 1	0 – 18	0 – 20	0 – 31	0.0	0 – 1	0 – 15
Transfer to Other Hospitals							
Mean	2.0	4.0	3.1	6.5	1.7	0.3	5.0
Median	0.0	0.0	0.0	1.5	0.0	0.0	0.0
Range	0 – 10	0 – 20	0 – 16	0 – 31	0 – 12	0 – 2	0 – 31
Restrict Access to Some Ambulance Patients							
Mean	0.7	9.5	8.1	12.9	3.5	0.7	6.3
Median	0.0	11.0	8.5	10.0	0.0	0.0	0.0
Range	0 – 6	0 – 18	0 – 25	0 – 31	0 – 16	0 – 3	0 – 30
Restrict Access to All Ambulance Patients							
Mean	0.0	2.6	2.0	3.7	2.8	0.0	6.4
Median	0.0	0.0	0.4	2.5	0.0	0.0	0.0
Range	0.0	0 – 8	0 – 9	0 – 14	0 – 16	0.0	0 – 31

responses to that situation. However, we believe that evidence of crowding beyond a minimum of a few days combined with a frequent decision to refuse transfers or divert ambulances are indicative of institutional problems in treating the numbers of patients using EDs and the consequences of hospital crowding in general.

Our examination of selected PMSAs indicates that almost all of the seven areas studied have at least some hospitals experiencing the consequences of high ED or high hospital use. Our information, in particular, points to Los Angeles, Detroit, and Washington, DC, as facing more serious difficulties, based on significant holding times, large percentages

of admissions through the ED, and the decisions to restrict ED or institution use.

However, there is little doubt that New York City is demonstrating the most extreme problems with hospital and ED crowding. By at least five key indicators — ICU and overall occupancy rates, waiting times for these beds, days of crowding, and the need to divert incoming ambulance patients — hospitals in New York City reported means far beyond those noted in other areas of the country.

Reasons for the crisis in New York City and elsewhere may vary.¹⁹ Some institutions, such as those in New York City, may have an insufficient number of beds. Difficulty in recruiting and retaining nurses and

emergency physicians also contributes to the problem. Changes in patient population could affect ED use. In particular, many hospitals are confronted with increases in the number of victims of violence, drug abuse, and AIDS as well as the elderly and the uninsured. Whatever the cause, progressive and continued crowding in these and neighboring institutions is likely to have a "ripple effect" among health care providers as growing numbers of hospitals are faced with higher rates of ED use, fewer hospitals are willing to accept transfer patients, and there is an increasing need to request ambulance diversion.

It is also important to note that our survey assessed hospital conditions in August 1988. Evidence suggests that hospital crowding has since grown much worse. On January 10, 1989, a New York State Department of Health audit of New York City hospitals found 599 ED patients awaiting admission to city hospitals at midnight.²⁰ Exactly one year to the day after their original audit, the New York State Department of Health revisited these hospitals and found 960 admitted patients waiting for a bed.²¹

Although we believe that our study results identify the broad nature of ED problems among teaching hospitals, many questions remain. Further investigation is necessary to examine the extent to which documented problems in teaching hospitals are indicative of what is happening in all hospitals around the country. Other issues to address include documenting whether the health status or outcome of patients whose ED entry is delayed due to transfer refusal or diversion is affected in any way. It would also be important to know if the hospital response to ED crowding had anything but an immediate, short-term effect on the problem.

Obviously much remains to be known about the extent of this problem, its origins, and potential solutions. On May 17, 1990, Congressman Rangel from New York formally requested that the General Accounting Office and the Secretary of Health and Human Services undertake a comprehensive survey of EDs

in US hospitals.²² The Joint Commission on Accreditation of Health-care Organizations is actively studying new guidelines and measures of the quality of ED care to reflect concerns about crowding. The American Hospital Association is surveying its member institutions to determine the extent and nature of hospital and ED crowding in community hospitals.²³

These investigations as well as other research are needed to systematically identify the causes of hospital and ED crowding to target those most amenable to public policy initiatives. Furthermore, increases in populations likely to use EDs strongly suggest the need for a concerted strategy by all levels of government. This strategy would incorporate the five interventions identified by the American College of Emergency Physicians: providing a basic level of health insurance for all citizens; removing financial disincentives to hospitals for providing emergency care; increasing the capacity to provide critical care, inpatient, and nursing home services; expanding the supply of nurses; and supporting access to primary care services and encouraging initiatives designed to prevent serious illness and injuries.²⁴

CONCLUSION

This year, the American Hospital Association predicts that ED visits nationwide will reach 90 million.²³ For many who are included in that total, ready access to high-quality emergency care may be difficult to find. With this level of demand and the great difficulties in meeting that demand, we look toward a future in which the quality and viability of an already strained emergency system may be even more dangerously compromised.

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